



Background:

The detrimental effects of fire suppression in southeastern longleaf pine-wiregrass savannas are well-documented. However, relatively little is known about associated changes in wetlands embedded in this ecosystem. Recent work suggests that several amphibian declines may be a result of altered fire regimes in southeastern wetlands. The reticulated flatwoods salamander (*Ambystoma bishopi*) was listed as federally endangered in March 2009 after separation from the frosted flatwoods salamander (*A. cingulatum*). Loss and alteration of habitat is considered a major threat and cause of population declines for both these species of flatwoods salamanders. Flatwoods salamanders breed in ephemeral pine flatwoods wetlands with dense herbaceous understory where their larvae develop and metamorphose into the terrestrial form. These wetlands have degraded over time as a shift away from natural fire regimes allows woody shrubs to encroach. The shrubby understory not only shades out herbaceous plants, and changes the litter layer, but may result in premature drying of wetlands.



Adult reticulated flatwoods salamander in wiregrass (left) and flatwoods salamander eggs (right). (Photographed by K. Jones)

Objective:

This project focused on how a range of potential vegetation management treatments influence herbaceous vegetation, hydroperiod, and use by the amphibian community (with emphasis on reticulated flatwoods salamanders). Salamander breeding habitat has been negatively affected by fire suppression and prescribed fires that occur only in the dormant season. As a result many historic breeding wetlands are no longer used by salamanders (or other declining amphibians) in the southeastern United States.

Summary of Approach:

We monitored the effects of a suite of habitat restoration methods that were applied to 25 ephemeral wetlands in an experimental framework on Eglin Air Force Base (high-quality (desired condition), low-quality (untreated control), mechanical/herbicide,

mechanical/herbicide + burn, and burn only). These methods will be useful as a tool to managers to improve the quality of breeding habitats for the reticulated flatwoods salamanders and a diverse suite of other amphibians and plants that depend on ephemeral wetlands across the southeastern U.S.



Reticulated flatwoods salamander breeding habitat with same tree in center background of photo, pre- (left) and post-treatment (right). (Photographed by K. Jones)

Benefit:

Ephemeral wetlands occur on installations throughout the southeastern US, and require management to avoid conflicts between military missions and sensitive species. Flatwoods salamanders (*A. bishopi* and *A. cingulatum*) occur on several military installations throughout the southeastern United States. Upon completion of this adaptive management project, we will be able to recommend the most appropriate methods to restore breeding habitat for these two federally protected species (considered umbrella species for the ecosystem) and will have contributed to their conservation and recovery. Identifying techniques that could enhance or replace burning would allow greater management flexibility, especially in areas in close proximity to infrastructure.

Accomplishments:

In this ongoing study, after two years post-treatment we have successfully reduced the midstory of 10 mechanically/herbicide treated wetlands. Further, sites treated with mechanical/herbicide + burn show promise in restoring the herbaceous component of the wetland. Additionally, we documented a population of between 95-160 adult *A. bishopi* using two adjacent breeding wetlands and developed microhabitat selection models for *A. bishopi* egg-deposition sites.

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